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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/750,633

12/22/2003

Arsen R. Hajian

NC 83,974

9926

26384

7590

01/25/2006

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EXAMINER

TURNER, SAMUEL A

ART UNIT

PAPER NUMBER

2877

DATE MAILED: 01/25/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- ## Status

- ## Disposition of Claims

- ## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 22 December 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All    b) ☐ Some \*    c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

Attachment(s)

- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## DETAILED ACTION

### *Priority*

Applicant's claim for domestic priority under 35 USC 119(e) is incorrect in that applicant does not make specific reference to the correct provisional application. Applicant claims benefit to provisional application 60/435,730. Which is not applicant's provisional application. Applicant's provisional application is 60/435,760.

### *Drawings*

The drawings are objected to because the drawings are informal and contain handwritten numerals and legends. Further, figure 2 must be labeled as prior art. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application.

### **Replacement Drawing Sheets**

Drawing changes must be made by presenting replacement sheets which incorporate the desired changes and which comply with 37 CFR 1.84. An explanation of the changes made must be presented either in the drawing amendments section, or remarks, section of the amendment paper. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). A replacement sheet must include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of the amended drawing(s) must not be labeled as "amended." If the changes to the drawing figure(s) are not accepted by the examiner, applicant will be notified of any required corrective action in the next Office action. No further drawing submission will be required, unless applicant is notified.

Identifying indicia, if provided, should include the title of the invention, inventor's name, and application number, or docket number (if any) if an application number

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has not been assigned to the application. If this information is provided, it must be placed on the front of each sheet and within the top margin.

### **Annotated Drawing Sheets**

A marked-up copy of any amended drawing figure, including annotations indicating the changes made, may be submitted or required by the examiner. The annotated drawing sheet(s) must be clearly labeled as "Annotated Sheet" and must be presented in the amendment or remarks section that explains the change(s) to the drawings.

### **Timing of Corrections**

Applicant is required to submit acceptable corrected drawings within the time period set in the Office action. See 37 CFR 1.85(a). Failure to take corrective action within the set period will result in ABANDONMENT of the application.

If corrected drawings are required in a Notice of Allowability (PTOL-37), the new drawings MUST be filed within the THREE MONTH shortened statutory period set for reply in the "Notice of Allowability." Extensions of time may NOT be obtained under the provisions of 37 CFR 1.136 for filing the corrected drawings after the mailing of a Notice of Allowability.

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 7, 8, 15, 16, 22-24, 31, and 32 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

With regard to the above listed claims, these claims are confusing in that they each contain multiple sentences with periods. The claims are confusing in that

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the end of each claim is not defined. For example, claims 6 contains 5 different periods. The claim(s) must be in one sentence form only.

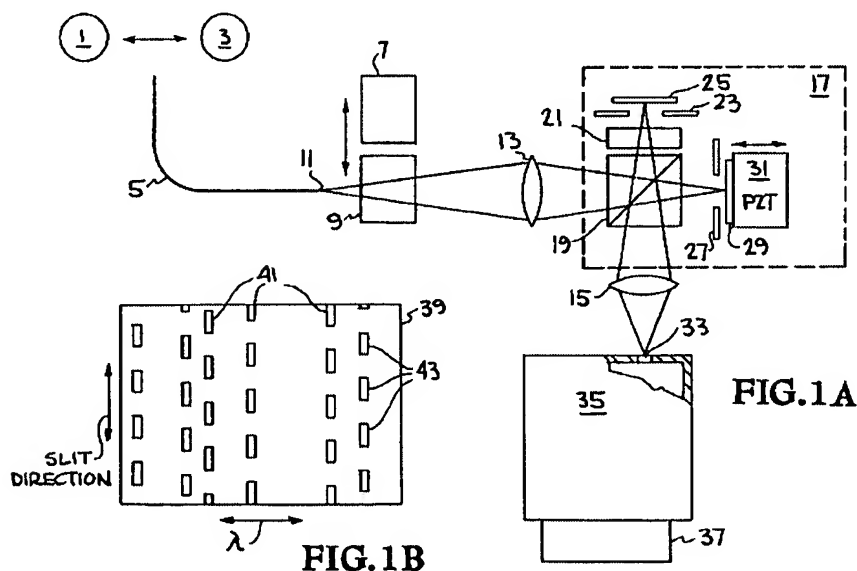
*Claim Rejections - 35 USC § 102*

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-9 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Erskine(6,351,307).



With regard to claim 1, Erskine teaches a dispersing Fourier Transform interferometer, comprising:

a Fourier Transform Spectrometer having an input for receiving a source light and an output(17); and

a dispersive element having an input coupled to the Fourier Transform Spectrometer output and an output for providing the resulting multiple narrowband interferogram outputs of different wavelengths representative of the source light input(35).

As to claim 2, comprising a metrology system for determining optical path lengths internal to the interferometer(31, column 11, lines 37-38).

As to claim 3, further comprising:

a sensor including a plurality of light intensity sensing elements each separately responsive to said different wavelengths for producing a set of data of interferogram intensities  $I_d$  measured at a set of discrete lags  $x_i$ (37); and

a processor for receiving and processing the data to produce a spectral output having a best fit with the set of data(column 12, lines 60-67; the processing element which maps the spectrum). While Erskine never mentions how the spectrum is mapped, clearly some processing computer must be inherent to the system to save the calibration data and determine the mapped spectrum.

As to claim 4, comprising a metrology system for determining optical path lengths internal to the interferometer(31, column 11, lines 37-38).

The remaining claim limitations found in claims 5-8 are functional limitations and these limitations can be met by the prior art if the structure of the prior art is capable of performing the claimed functions.

*2114 [R-1] Apparatus and Article Claims — Functional Language*

APPARATUS CLAIMS MUST BE STRUCTURALLY DISTINGUISHABLE  
FROM THE PRIOR ART

While features of an apparatus may be recited either structurally or functionally, claims directed to an apparatus must be distinguished from the prior art in terms of structure rather than function. In re Schreiber, 128 F.3d 1473, 1477-78, 44 USPQ2d 1429, 1431-32 (Fed. Cir. 1997) (The absence of a disclosure in a prior art reference relating to function did not defeat the Board's finding of anticipation of claimed apparatus because the limitations at issue were found to be inherent in the prior art reference); see also In re Swinehart, 439 F.2d 210, 212-13, 169 USPQ 226, 228-29 (CCPA 1971); In re Danly, 263 F.2d 844, 847, 120 USPQ 528, 531 (CCPA 1959). "[A]pparatus claims cover what a device is, not what a device does." Hewlett-Packard Co. v. Bausch & Lomb Inc., 909 F.2d 1464, 1469, 15 USPQ2d 1525, 1528 (Fed. Cir. 1990) (emphasis in original).

As to claim 9, wherein the source light is an astronomical emission(column 7, line 52).

*Claim Rejections - 35 USC § 103*

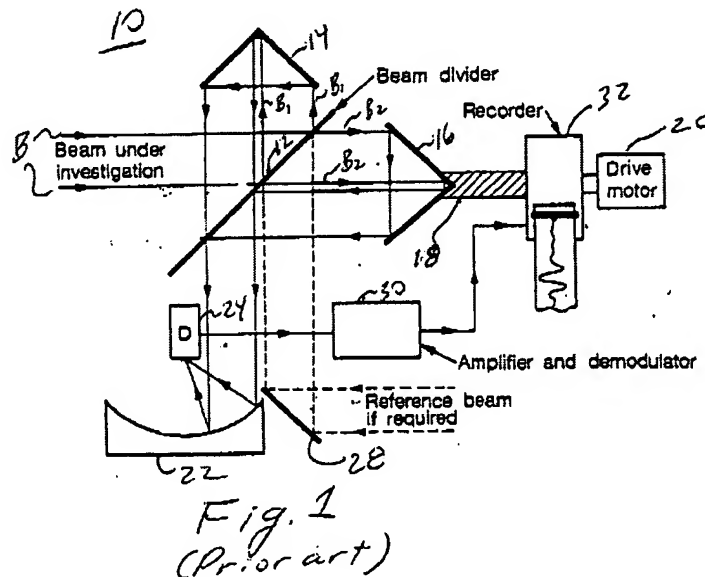
The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 10-28, and 33-35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Erskine(6,351,307) in view of applicant's prior art figure 1.



See applicant's specification paragraphs [0003] to [0008].

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Erskine apparatus by replacing the Michelson interferometer 17 with the Michelson interferometer 10 of applicant's prior art figure 1. While both are Michelson interferometers, applicant's figure 1 prior art includes a separate monochromatic reference beam which interferometrically



measures the displacement of the scanning mirror 16. This would have been superior to the Michelson interferometer of Erskine which determines the optical path difference by the current which drive the PZT actuator 31.

As to claim 10, wherein the source light is emitted from a material upon induction of the material into an excited state(applicant's specification paragraph [0003]).

As to claim 11, wherein the material is an unknown compound subjected to testing to determine the presence of possible biologically or chemically hazardous properties. It would have been obvious to one of ordinary skill in the art at the time the invention was made apply a spectrometer to any sample for spectral analysis(applicant's specification paragraph [0003]).

As to claim 12. As interferometer as in claim 1, wherein the Fourier Transform Spectrometer comprises:

optics for receiving and collimating a source light along a first optical path(not shown, see collimated input light beam in figure 1);

a beamsplitter positioned for splitting the collimated source light into a second light beam along a second optical path differing from said first optical path(12);

a first reflector positioned along said first optical path for reflecting light transmitted through said beamsplitter back toward a beamsplitter(14);

a second reflector positioned along said second optical path for reflecting said second light beam back toward a beamsplitter(16); and

wherein the interferometer further comprises:

a sensor including a plurality of light intensity sensing elements each separately responsive to said different wavelengths for producing a set of data of interferogram intensities  $I_d$  measured at a set of discrete lags  $x_i$ (37; Erskine); and

a processor for receiving and processing the data to produce a spectral output having a best fit with the set of data(column 12, lines 60-67; the processing element which maps the spectrum). While Erskine never mentions how the spectrum is mapped, clearly some processing computer must be inherent to the system to save the calibration data and determine the mapped spectrum.

The remaining claim limitations found in claims 13-16 are functional limitations and these limitations can be met by the prior art if the structure of the prior art is capable of performing the claimed functions.

***2114 [R-1] Apparatus and Article Claims — Functional Language***

**APPARATUS CLAIMS MUST BE STRUCTURALLY DISTINGUISHABLE  
FROM THE PRIOR ART**

While features of an apparatus may be recited either structurally or functionally, claims directed to an apparatus must be distinguished from the prior art in terms of structure rather than function. In re Schreiber, 128 F.3d 1473, 1477-78, 44 USPQ2d 1429, 1431-32 (Fed. Cir. 1997) (The absence of a disclosure in a prior art reference relating to function did not defeat the

Board's finding of anticipation of claimed apparatus because the limitations at issue were found to be inherent in the prior art reference); see also *In re Swinehart*, 439 F.2d 210, 212-13, 169 USPQ 226, 228-29 (CCPA 1971); *In re Danly*, 263 F.2d 844, 847, 120 USPQ 528, 531 (CCPA 1959). "[A]pparatus claims cover what a device is, not what a device does." *Hewlett-Packard Co. v. Bausch & Lomb Inc.*, 909 F.2d 1464, 1469, 15 USPQ2d 1525, 1528 (Fed. Cir. 1990) (emphasis in original).

As to claim 17, wherein the source light is an astronomical emission(column 7, line 52; **Erskine or applicant's paragraph [0003]**).

As to claim 18, wherein the source light is emitted from a material upon induction of the material into an excited state(**applicant's specification paragraph [0003]**).

As to claim 19, wherein the material is an unknown compound subjected to testing to determine the presence of possible biologically or chemically hazardous properties. It would have been obvious to one of ordinary skill in the art at the time the invention was made apply a spectrometer to any sample for spectral analysis(**applicant's specification paragraph [0003]**).

With regard to claim 20, a dispersing Fourier Transform interferometer, comprising:

optics for receiving and collimating a source light along a first optical path(not shown, see collimated input light beam in figure 1);

a beamsplitter positioned for splitting the collimated source light into a second light beam along a second optical path substantially orthogonal to said first optical path(12);

a first reflector positioned along said first optical path for reflecting light transmitted through said beamsplitter back toward said beam splitter(14);

a second reflector positioned along said second optical path for reflecting said second light beam back toward said beamsplitter(16);

a programmable drive train coupled to at least one of said first and second reflectors for moving said coupled reflector along its associated optical path so as to introduce a variable path difference  $x$  between said first and second optical paths(20,30,32) whereby said source light and said second light beam recombine at said beamsplitter and are recorded on a multielement detector at a variety of delays, comprising an interferogram(37; Erskine);

a metrology detector for determining the path length difference between the two reflectors(24);

a dispersive element positioned along said second optical path for receiving a Fourier Transform Spectrometer output and for providing a resulting multiple narrowband interferogram outputs of different wavelengths representative of the source light input(35; Erskine);

a sensor including a plurality of light intensity sensing elements each separately responsive to said different wavelengths for producing a set of data of interferogram intensities  $I_d$  measured at a set of discrete lags  $x_i$ (37); and

a processor for receiving and processing the data to produce a spectral output having a best fit with the set of data(column 12, lines 60-67; the processing

element which maps the spectrum). While Erskine never mentions how the spectrum is mapped, clearly some processing computer must be inherent to the system to save the calibration data and determine the mapped spectrum.

The remaining claim limitations found in claims 21-24 are functional limitations and these limitations can be met by the prior art if the structure of the prior art is capable of performing the claimed functions.

*2114 [R-1] Apparatus and Article Claims — Functional Language*

APPARATUS CLAIMS MUST BE STRUCTURALLY DISTINGUISHABLE  
FROM THE PRIOR ART

While features of an apparatus may be recited either structurally or functionally, claims directed to an apparatus must be distinguished from the prior art in terms of structure rather than function. In re Schreiber, 128 F.3d 1473, 1477-78, 44 USPQ2d 1429, 1431-32 (Fed. Cir. 1997) (The absence of a disclosure in a prior art reference relating to function did not defeat the Board's finding of anticipation of claimed apparatus because the limitations at issue were found to be inherent in the prior art reference); see also In re Swinehart, 439 F.2d 210, 212-13, 169 USPQ 226, 228-29 (CCPA 1971); In re Danly, 263 F.2d 844, 847, 120 USPQ 528, 531 (CCPA 1959). "[A]pparatus claims cover what a device is, not what a device does." Hewlett-Packard Co. v. Bausch & Lomb Inc., 909 F.2d 1464, 1469, 15 USPQ2d 1525, 1528 (Fed. Cir. 1990) (emphasis in original).

As to claim 25, wherein the source light is an astronomical emission(column 7, line 52; Erskine or applicant's paragraph [0003]).

As to claim 26, wherein the source light is emitted from a material upon induction of the material into an excited state(applicant's specification paragraph [0003]).

As to claim 27, wherein the material is an unknown compound subjected to testing to determine the presence of possible biologically or chemically hazardous properties. It would have been obvious to one of ordinary skill in the art at the time the invention was made apply a spectrometer to any sample for spectral analysis(applicant's specification paragraph [0003]).

Official notice is taken that so called "best fit" algorithms are well known in the processing art for fitting measured data to reference data. See In re Malcom, 1942 C.D 589; 543 O.G. 440.

If applicant does not traverse the examiner's assertion of official notice or applicant's traverse is not adequate, the next Office action will indicate that the common knowledge or well-known in the art statement is taken to be admitted prior art because applicant either failed to traverse the examiner's assertion of official notice or that the traverse was inadequate.

With regard to claim 28, a method of determining a spectrum of a light source, comprising:

receiving and collimating a source light along a first optical path(not shown, see collimated input light beam in figure 1);

transmitting a first part of the collimated source light further along said first optical path while reflecting a second part of the collimated source light along a second optical path(12);

reflecting back said first part of said collimated source light along said first optical path(14);

reflecting back said second part of said collimated source light along said second optical path(16);

introducing a path length difference  $x$  between said first and second optical paths(20,30,32);

recombining said back-reflected first and second parts of said collimated source light(12);

dispersing said recombined light into a plurality of different wavelengths(35; Erskine);

separately sensing an intensity  $I$  of each of said plurality of different wavelengths to thereby produce a set of data of interferogram intensities  $I_d$  measured at a set of discrete lags  $x_i$ (37; Erskine); and

processing the data so as to produce a spectral output having a best fit with the set of data(column 12, lines 60-67; the processing element which maps the spectrum). While Erskine never mentions how the spectrum is mapped, clearly some processing computer must be inherent to the system to save the calibration data and determine the mapped spectrum. It would have been obvious to one of ordinary skill in the art at the time the invention was made apply a “best fit” algorithm in order to fit the measured data with the iodine reference spectrum(column 8, lines 12+).

As to claim 33, wherein the source light is an astronomical emission(column 7, line 52; Erskine or applicant’s paragraph [0003]).

As to claim 34, wherein the source light is emitted from a material upon induction of the material into an excited state(applicant's specification paragraph [0003]).

As to claim 35, wherein the material is an unknown compound subjected to testing to determine the presence of possible biologically or chemically hazardous properties. It would have been obvious to one of ordinary skill in the art at the time the invention was made apply a spectrometer to any sample for spectral analysis(applicant's specification paragraph [0003]).

*Allowable Subject Matter*

Claims 29 and 30 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claims 31 and 32 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

The prior art of record fails to teach the specific sparse sampling algorithm used to produce the spectral output. Erskine uses a vector analysis and Nettleton(GB 2,317,446 A) is silent on any post detector processing.



*Relevant Prior Art*

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Nettleton(GB 2,317,446 A) discloses a combination dispersive spectrometer and Sagnac interferometer spectrometer.

*Conclusion*

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Samuel A. Turner whose phone number is 571-272-2432.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory J. Toatley, Jr., can be reached on 571-272-2800 ext. 77.

The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

A handwritten signature in black ink, appearing to read 'Samuel A. Turner', with a stylized flourish at the end.

Samuel A. Turner  
Primary Examiner  
Art Unit 2877